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$$110 \quad dM_V/dt = E - V$$

$$115 \quad dM_L/dt = F - L - E$$

$$120 \quad dH_V/dt = Eh_V(T_1) - Vh_V(T_V) + \phi_E$$

$$125 \quad dH_L/dt = Fh_F - Lh_L(T_L) - Eh_V(T_L) + \phi - \phi_E$$

$$130 \quad E = kLA(P^* - P)$$

$$135 \quad \phi_E = uA(T_L - T_V)$$

$$140 \quad H_V = M_V h_V(T_V)$$

$$145 \quad H_L = M_L h_L(T_L)$$

$$150 \quad P^* = P^*(T_L)$$

$$155 \quad PV_V = M_V RT_V$$

$$160 \quad V_T = V_V + M_L / P_L$$

Fig. 1
(Prior Art)

```

noTnoM1={
    Mv[i]''==Fv[i]+E[i]-V[i],
    M1[i]')==F1[i]-L[i]-E[i],
    Hv'==Sum[Fv[i]hfv[i]+E[i]hv[i][T1]-V[i]hv[i][Tv], {i, ncomp}],
    H1'==Sum[F1[i]hfl[i]-L[i]hl[i][T1+E[i]hv[i][T1], {i, ncomp}]] }

noTnoM2={
    E[i]==k1A(Psat[i]-P),
    QE==uA(T1-Tv) };

noTnoM3={
    Hv==Sum[Mv[i]hv[i][Tv], {i, ncomp}],
    H1==Sum[M1[i]hl[i][T1], {i, ncomp}],
    Psat[i]==Pl[i][T1],
    PVv==Sum[Mv[i], {i, ncomp}] RTv};

noTnoM4={Vt==Vv+Sum[M1[i]/Rho_1[i], {i, ncomp}]]};

noTnoM=Join[noTnoM1, noTnoM2, noTnoM3, noTnoM4]

```

Fig. 2

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$$\phi_E = 0$$

$$H = H_L + H_V$$

$$T = T_L = T_V$$

Fig. 3

$$M = M_L + M_V$$

$$P_T = P^* = P$$

Fig. 4

$$M_V = 0$$

$$M = M_L$$

Fig. 5

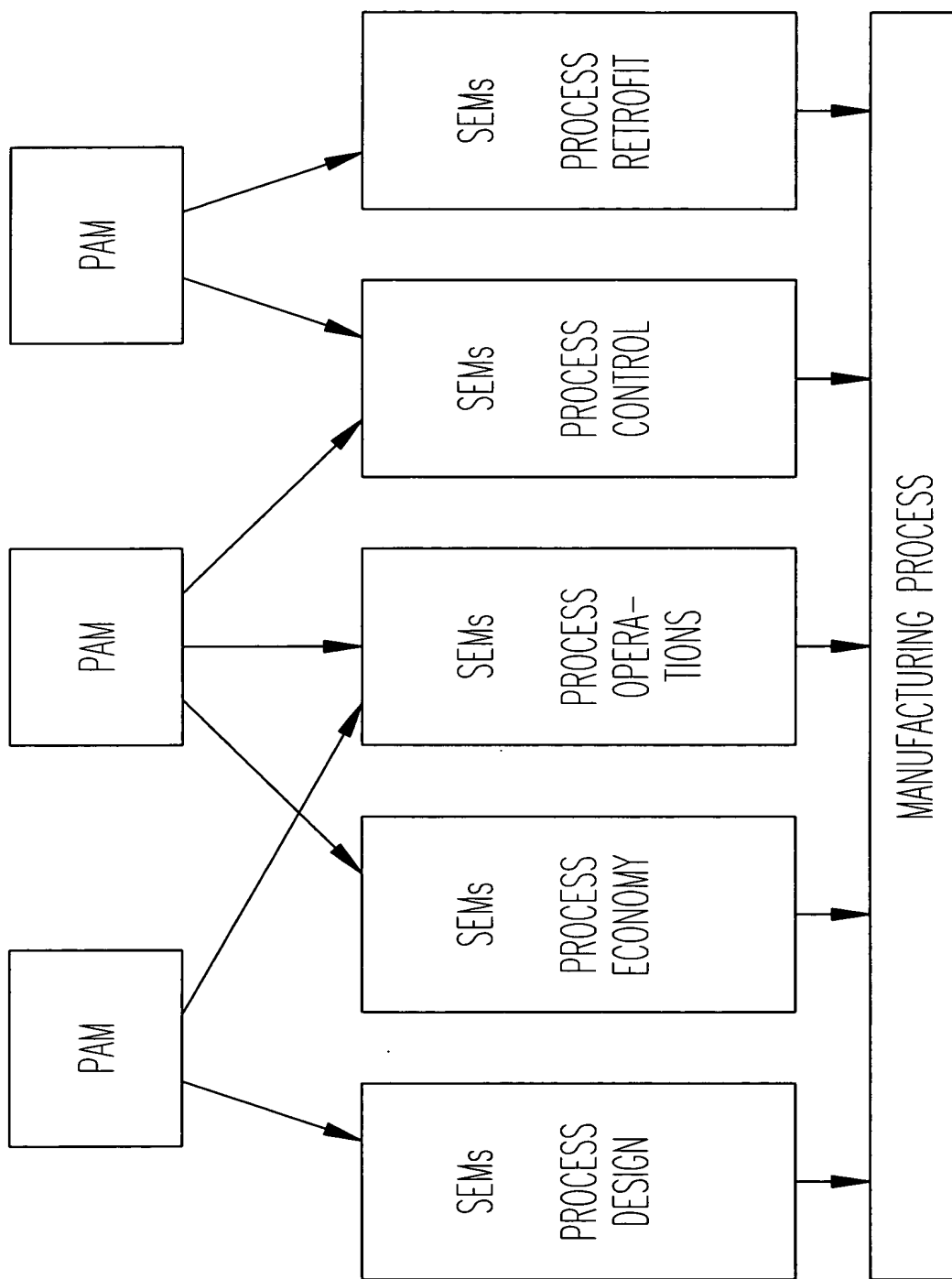
$$\begin{aligned}
 dM/dt &= F - L - V \\
 dH/dt &= Fh_F - Lh_L - Vh_V + \phi \\
 H &= Mh_L(T)
 \end{aligned}$$

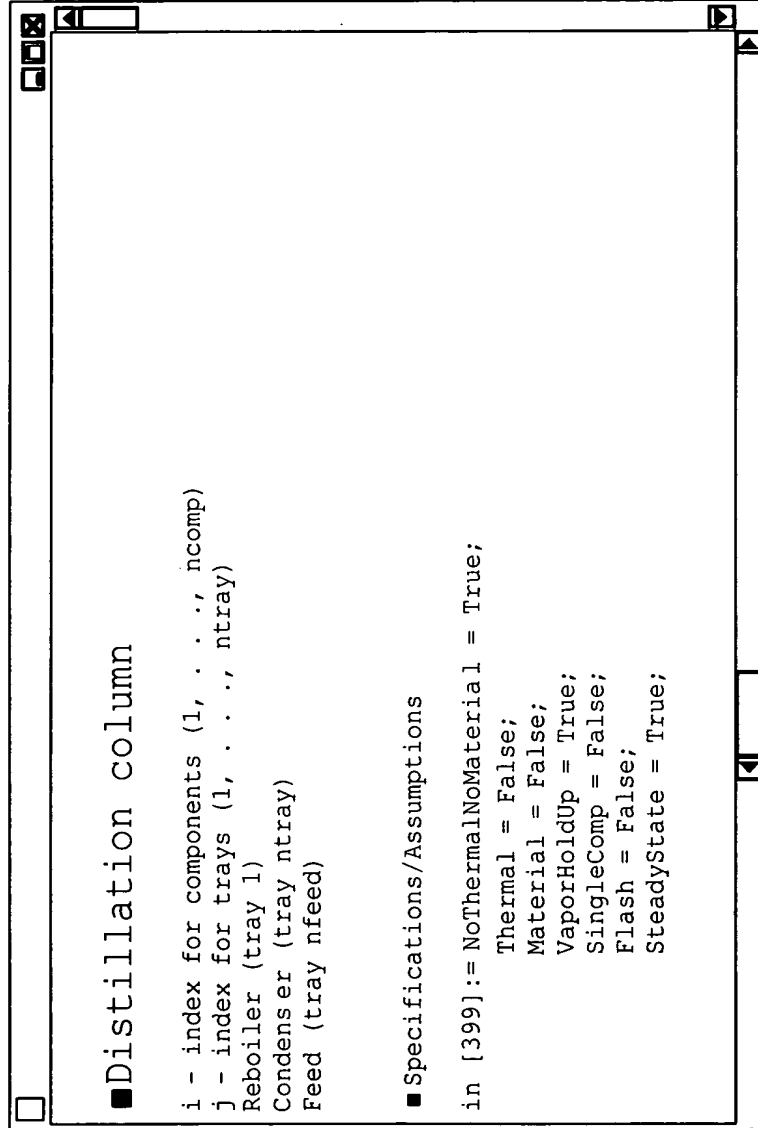
Fig. 6

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$$\begin{aligned}
 M[i]' &= F_L[i] + F_V[i] - L[i] - V[i] \\
 H' &= N + \sum_{i=1}^{n_{\text{comp}}} F_L[i] h_{F_L}[i] - \sum_{i=1}^{n_{\text{comp}}} L[i] h_L[i] [T] + \sum_{i=1}^{n_{\text{comp}}} F_V[i] h_{F_V}[i] \\
 H &= \sum_{i=1}^{n_{\text{comp}}} M[i] - 0 h_L[i] [T]
 \end{aligned}$$

Fig. 7

*Fig. 8*

*Fig. 9*

```

Out [435]= {0==e[i][j]+Fv[i][j]+V[i][-1+j]-V[i][j],
0== -e[i][j]+Fl[i][j]-L[i][j]+L[i][1+j],
0==QE[j]+  $\sum_{i=1}^{ncomp} (Fv[i][j]hfv[i][Tf[j]]+e[i][j]hv[i][Tl[j]]-V[i][j]hv[i][Tv[j]]+V[i][j-1]hv[i][Tv[j-1]]),$ 
0==Q[j]-QE[j]+  $\sum_{i=1}^{ncomp} (Fl[i][j]hfl[i][Tf[j]]-L[i][j]hl[i][Tl[j]]-e[i][j]hv[i][Tl[j]]+L[i][j+1]hl[i][Tl[j+1]]),$ 
e[i][j]==Ak1(-P[j]+Psat[i][j]), QE[j]==Au(Tl[j]-Tv[j]),
Hv[j]==  $\sum_{i=1}^{ncomp} Mv[i][j]hv[i][Tv[j]],$ 
Hl[j]==  $\sum_{i=1}^{ncomp} Ml[i][j]hl[i][Tl[j]],$ 
Psat[i][j]==Pl[i][Tl[j]],
P[j]Vv[j]==R  $\left( \sum_{i=1}^{ncomp} Mv[i][j] \right) Tv[j],$ 
Vt[j]==  $\sum_{i=1}^{ncomp} \frac{Ml[i][j]}{Rho_1[i][Tl[j]]} + Vv[j]$ 

```

Fig. 10